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Title: Seeing is Believing? Understanding the Interplay Between Observations and Simulations of Star Formation

Author(s): Smullen, Rachel Ann
Fryer, Christopher Lee
Donley, Jennifer Lynn

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Seeing is Believing?

Understanding the Interplay Between Observations and Simulations of Star Formation



Rachel Smullen (CCS-2)

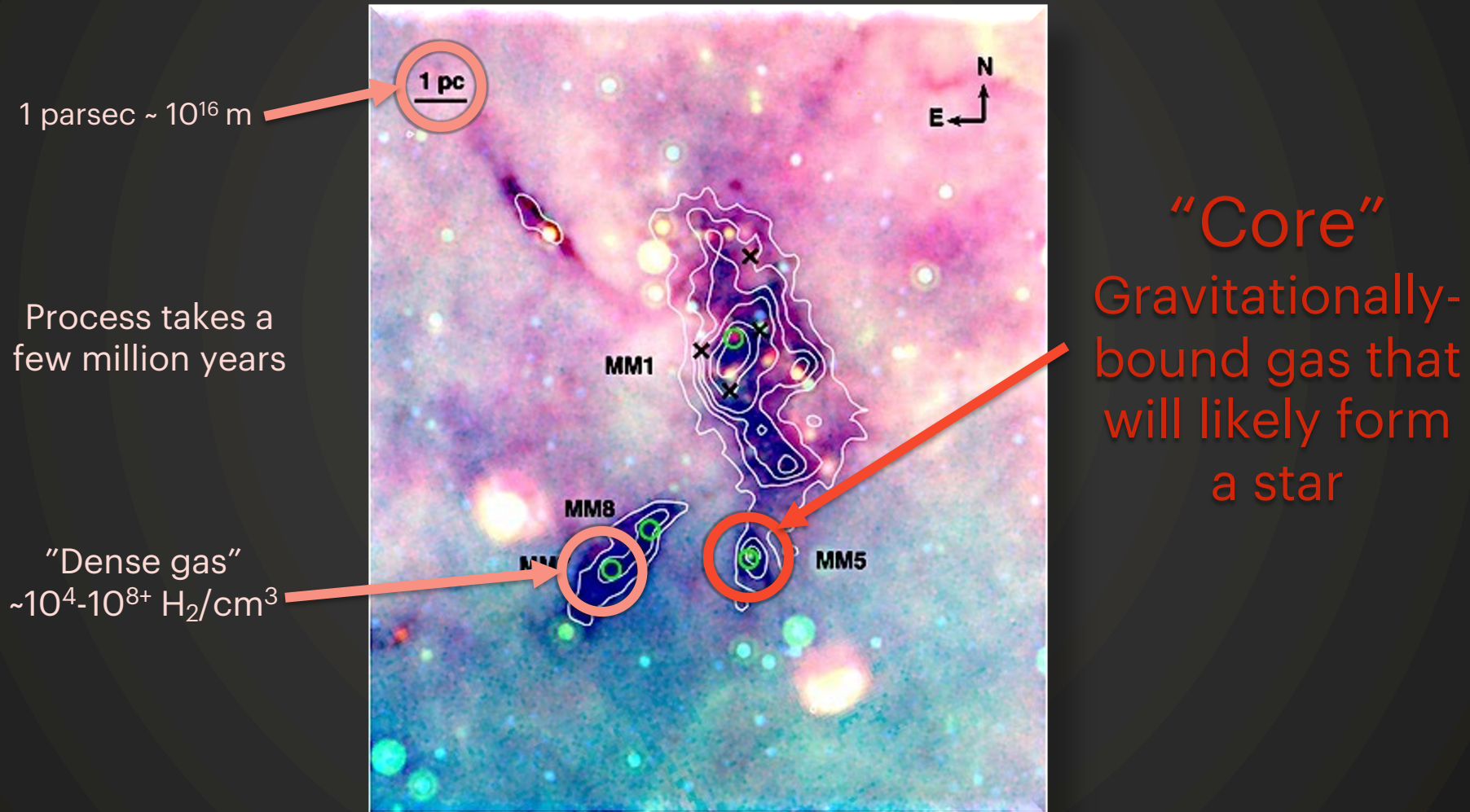
Supervisors: Chris Fryer (CCS-2)
Jennifer Donley (XTD-IDA)

20 January 2021

Agnew & Metropolis Postdoctoral
Fellow Research Showcase

What is star formation?

The gravitational collapse of dense gas into a star

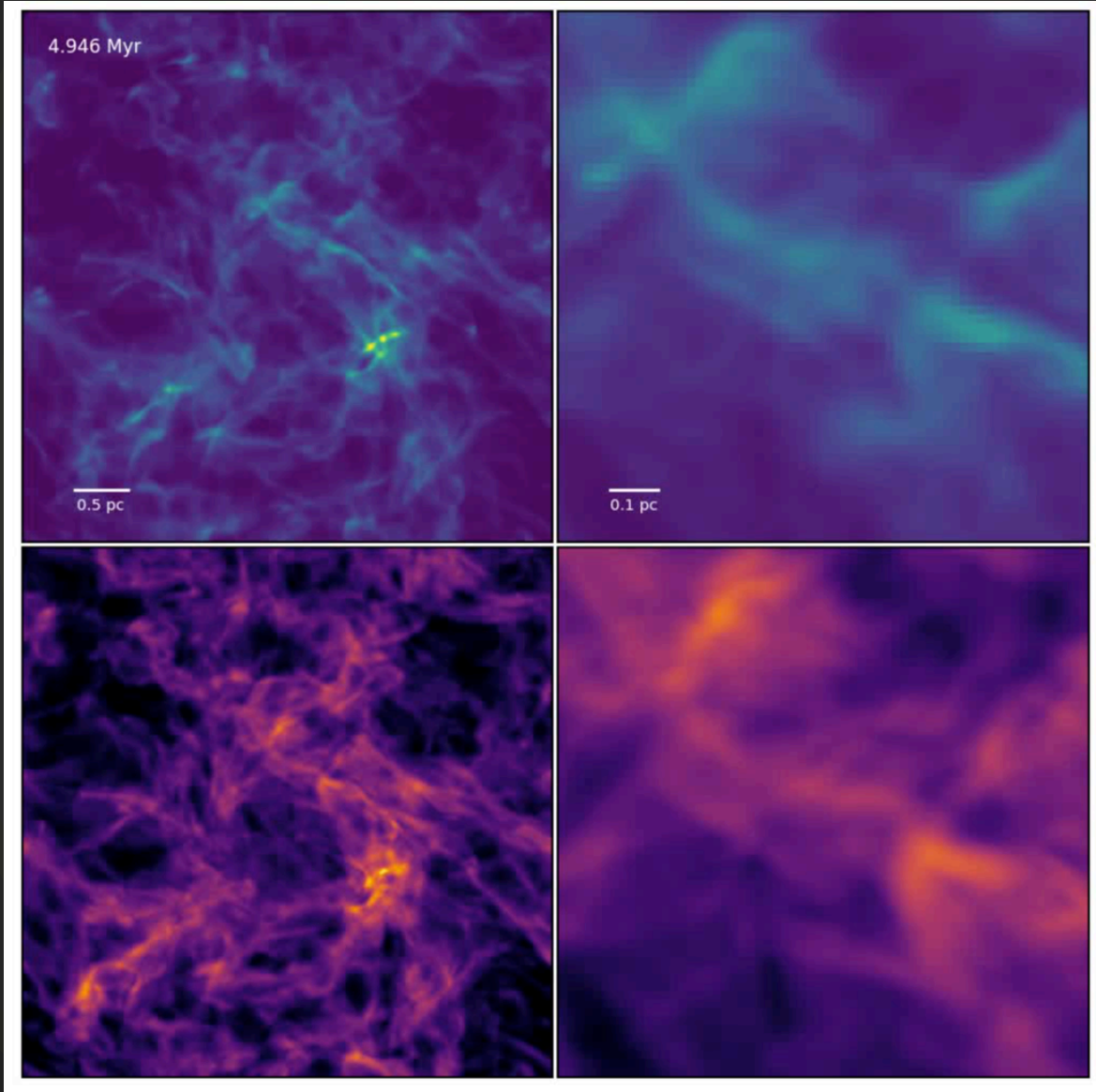


Observation of G28.53-0.25: Lu+2015

Star formation is a confluence of many physical processes

Simulation
(Gas density)

Observation
(Ammonia: NH_3)



Gravity

Fluid Dynamics

Turbulence

Magnetic Fields

Radiation

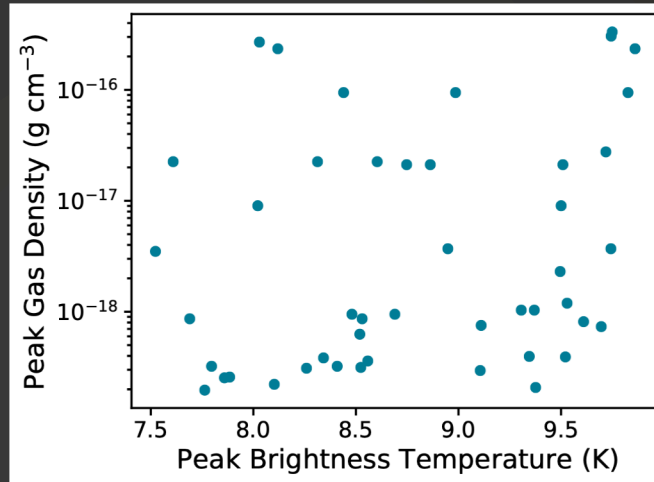
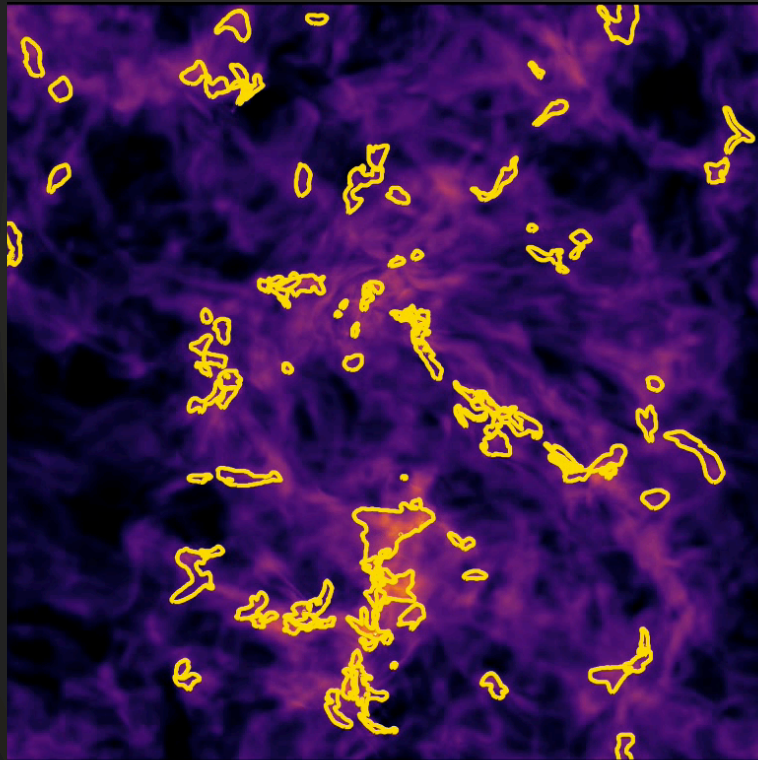
Chemistry

Shock physics

and more...

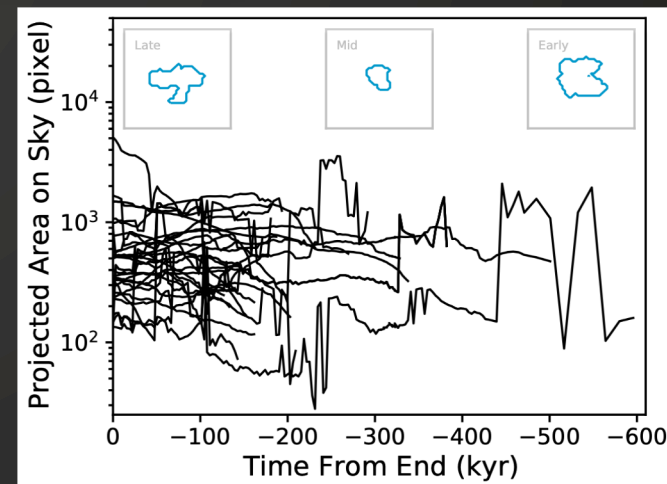
What are the
time-evolving
observational and physical
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of gas that will form a star?

What are the **time-evolving** observational and physical properties of gas that will form a star?



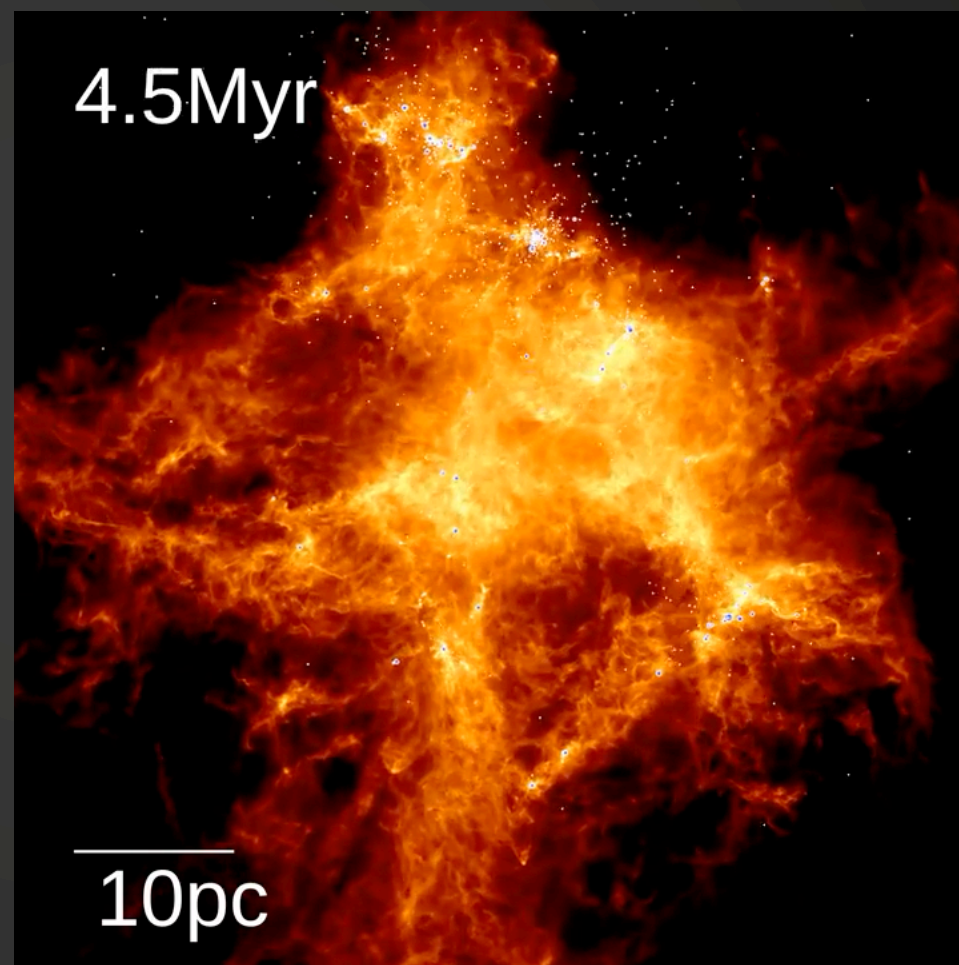
Correlating “reality”
and observations at
one time:
characterize trends/
possible mistakes in
observation
interpretation

Understanding time
evolution of cores:
current structure
finders aren’t
adaptable for
changing
environments



Looking toward the future

- For more statistical power, will use *state-of-the-art simulations* from the STARFORGE collaboration
- Will develop *new, flexible techniques* for identifying and tracking cores through time



STARFORGE collaboration; Grudić+2020